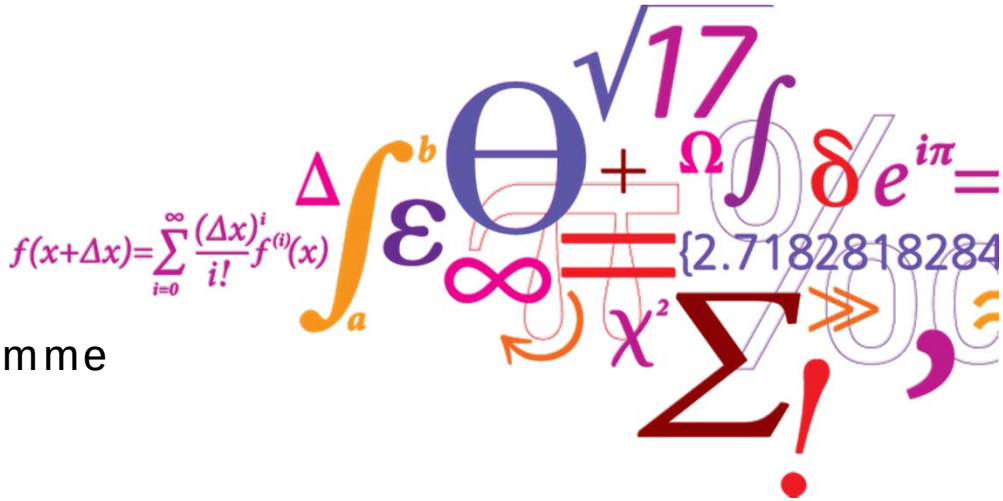
The European Energy Research Alliance (EERA) – Aligning National and European Wind Energy Research

Madsen, Peter Hauge

Publication date:
2013

The European Energy Research Alliance (EERA)

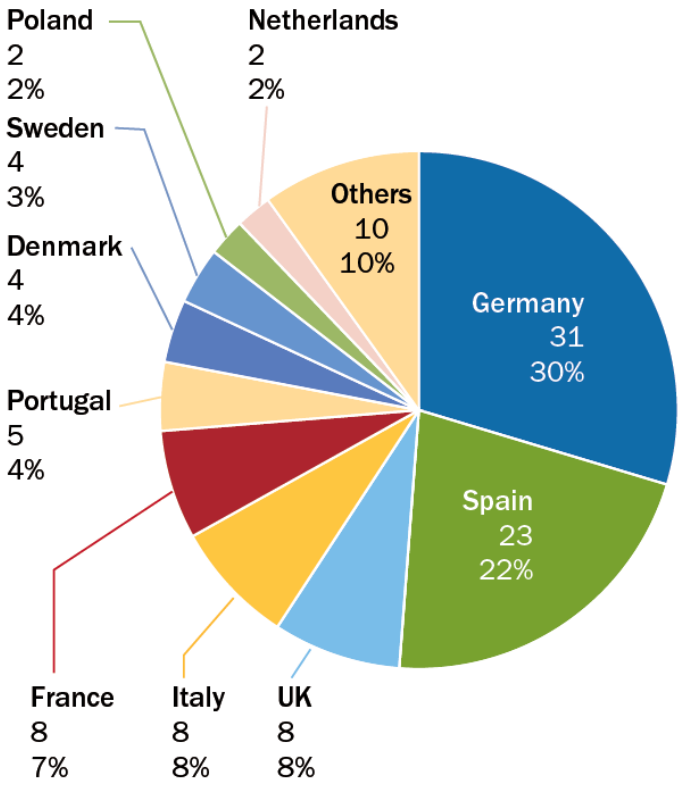
– Aligning National and European Wind Energy Research



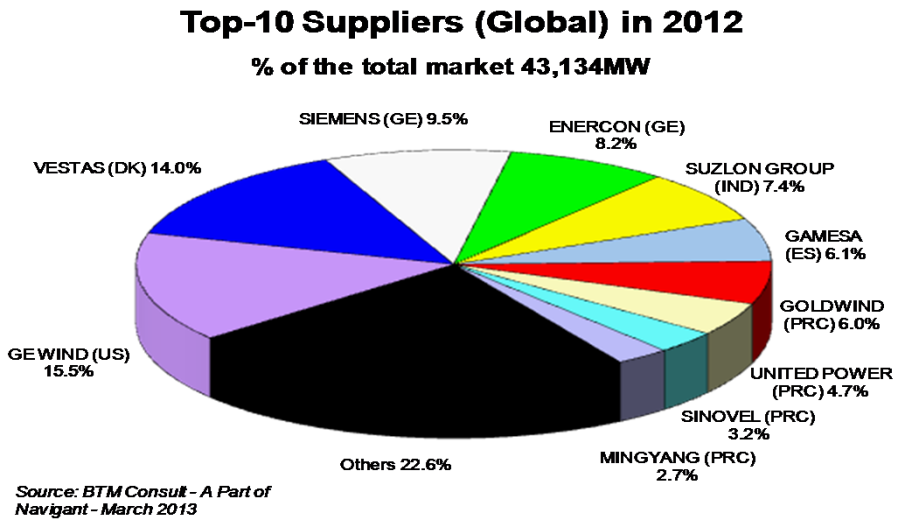
Peter Hauge Madsen
Head of Department of Wind Energy
Coordinator of the EERA Joint Programme on Wind Energy

DTU Wind Energy
Department of Wind Energy

Wind energy is international

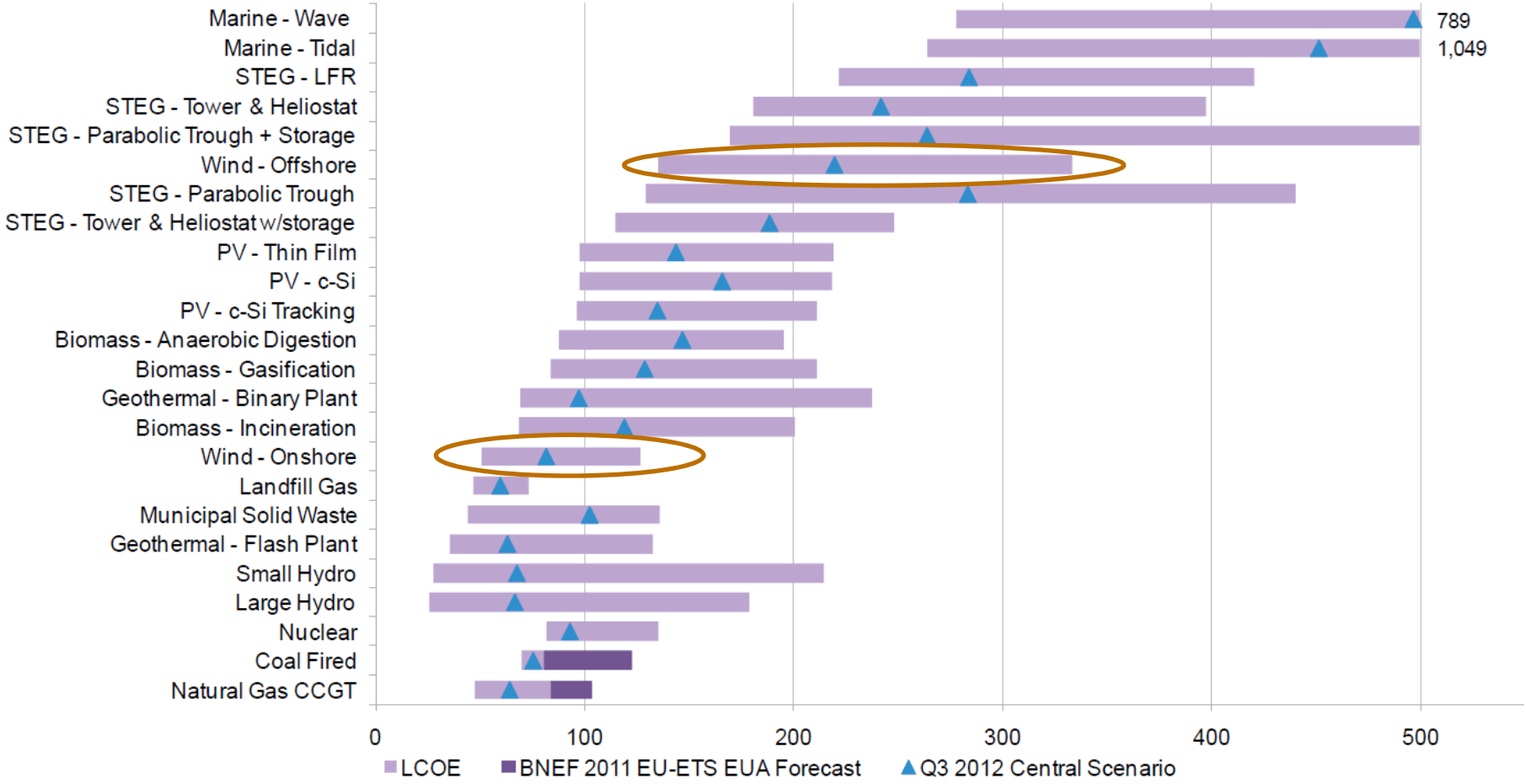


EU MEMBER STATE MARKET SHARES FOR TOTAL INSTALLED CAPACITY. TOTAL 106 GW



In 2012 wind energy contributed 2.62% to worldwide electricity generation, 7 % in Europe

Global levelised cost of electricity ranges for developed markets ($/MWH) Q3 2012



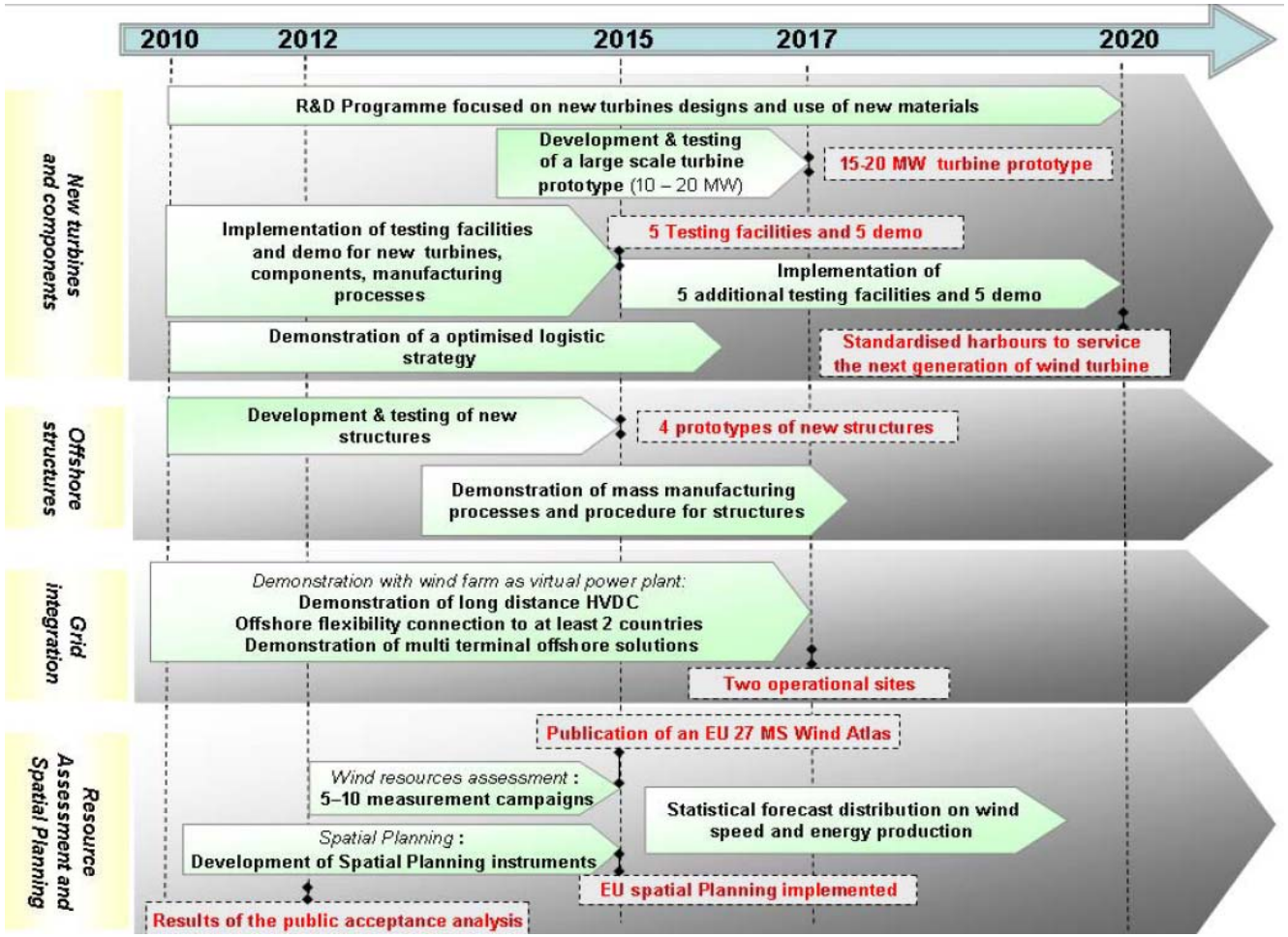
Note: Carbon forecasts from the Bloomberg New Energy Finance European Carbon Model with an average price to 2020 of $30/tCO2. Coal prices from US EIA, average price to 2030 of $3.07/mmBtu. Natural gas prices from EIA & BNEF with central scenario average price to 2030 $8.39/mmBtu. Developed markets defined as countries with well developed markets for renewable energy

Source: Bloomberg New Energy Finance.

SET Plan

- **The SET-Plan** adopted in November 2007 is the technology pillar of the EU's energy and climate change policy
- **Objective** is to accelerate the development of low carbon technologies leading to their market take-up
- **Strategy:** a Research and Innovation chain approach (from ideas to market) and a supply chain approach (from materials to system integration and energy services) -

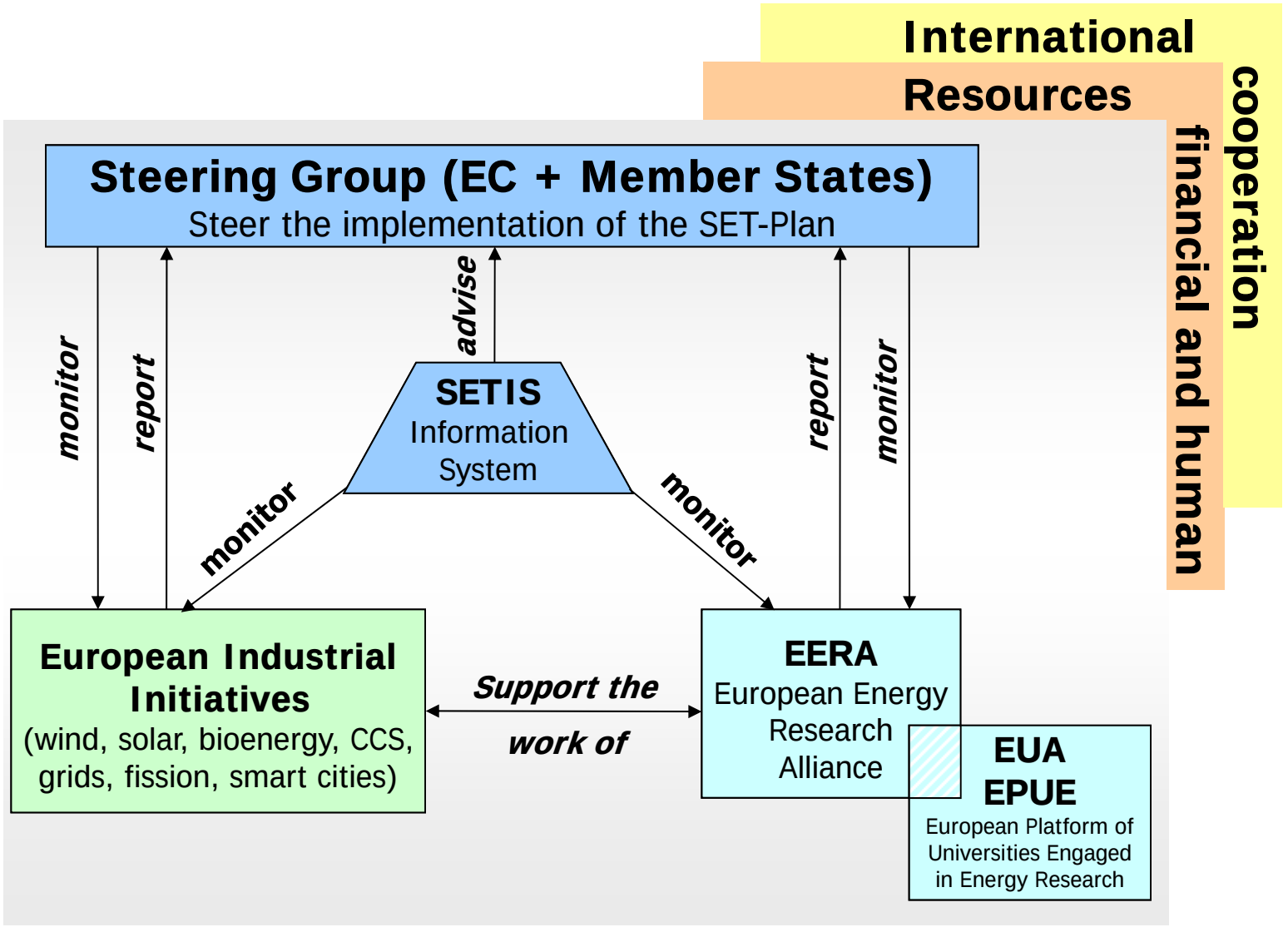
Background – EC SET-plan



The Joint Programme is strategically directed towards the scientific challenges following the implementation of the SET Plan and the RES Directive:

- **Large scale integration** and
- **An accelerated offshore wind energy deployment**, including
- **Very large offshore wind turbines.**

SET-Plan structure



What is EERA?

The European Energy Research Alliance was established in 2008 to support the SET-plan.

Mission: aims to accelerate the development and deployment of cost-effective low carbon technologies

Cooperation of Energy Research Organisations

- ✓In principle open to all research organisations
- ✓Activities based on participants own resources, but
  - Complemented by competitive funding from the European Commission (FP7)
- Long-term strategy, Agreed Division of Tasks and Responsibilities
  - EERA virtual teams working on one topic (specialization)
- ✓More than 200 participating organisations
- ✓Collaborating in 15 EERA Joint Programmes

Vision

The EERA joint programme on wind energy established 2010 accelerates the SET-plan goals, provides the strategic leadership for the scientific–technical medium to long term research to support the EII and the Technology Roadmap's activities on wind energy and provides added value through:

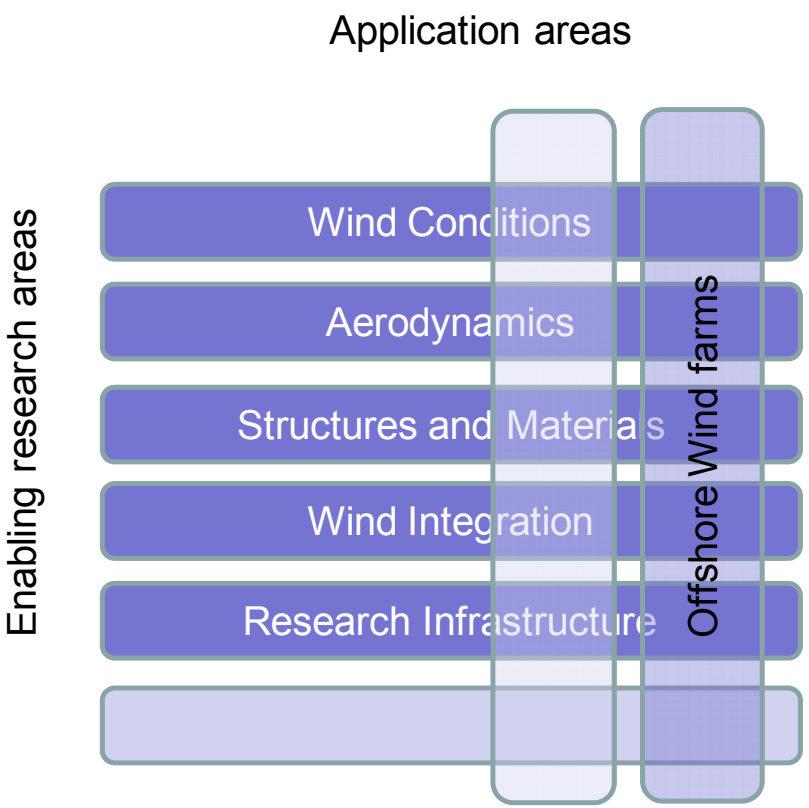
- Strategic leadership of the underpinning research
- Joint prioritisation of research tasks and infrastructure
- Alignment of European and national research efforts
- Execution of coordinated and structured research in medium to long-term programmes
- Coordination with industry, and
- Sharing of knowledge and research infrastructure.

EERA
European Energy Research Alliance

EERA JP Wind structure

The joint programme comprises the following 6 sub-programmes:

- **Wind Conditions**. Coordinated by DTU in Denmark.
- **Aerodynamics**. Coordinated by ECN in the Netherlands.
- **Offshore Wind Energy.** Coordinated by SINTEF in Norway.
- **Grid Integration.** Coordinated by FhG IWES in Germany.
- **Research Facilities**. Coordinated by CENER in Spain.
- **Structures and Materials.** Coordinated by CRES, Greece



Sub-Programme Offshore Wind Energy
Coordinator John Tande

Research objectives

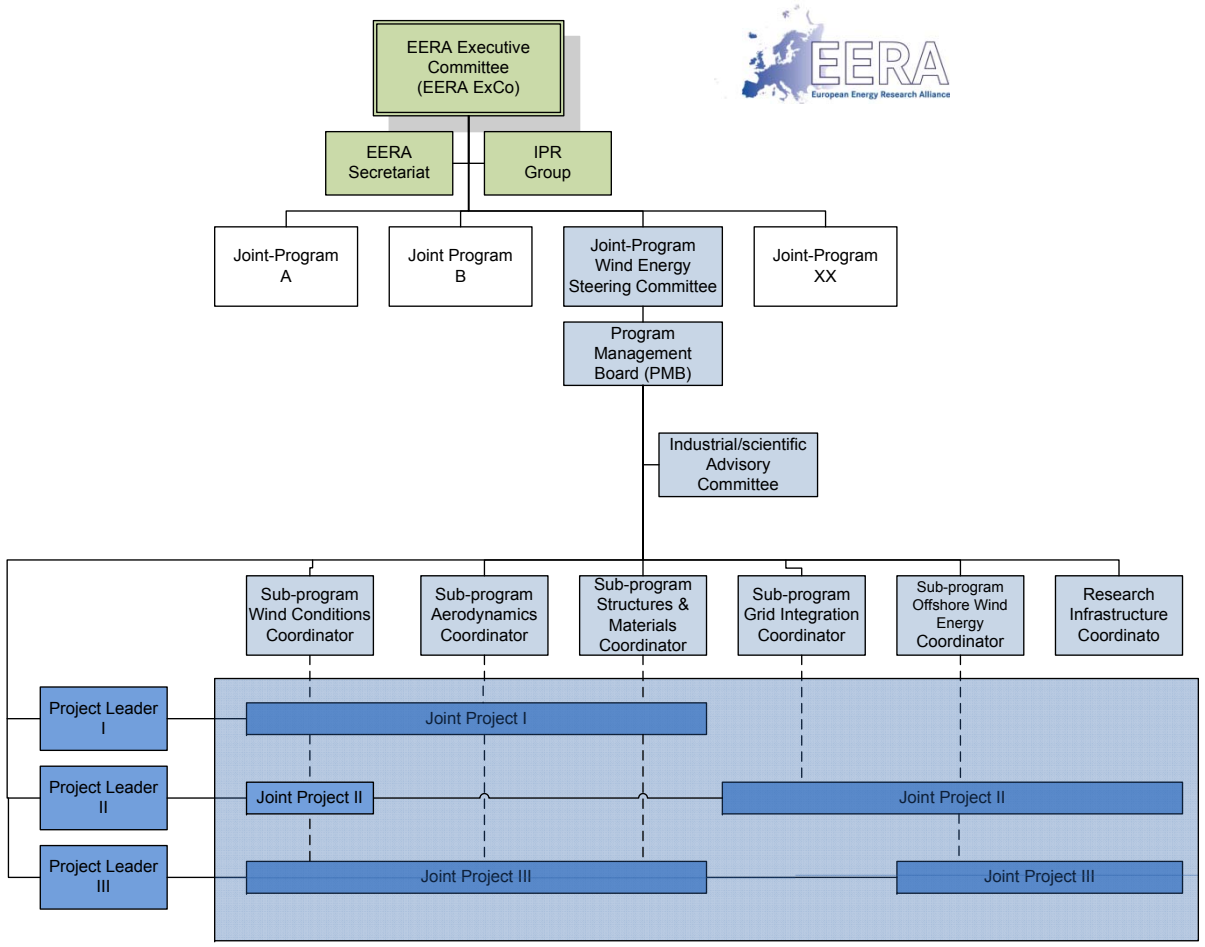
The overall objective is to lay a scientific foundation for the industrial development of more cost effective offshore wind farms and enabling large scale deployment at any seas

- Integrated numerical design tools for large deep offshore WTs
- Characterization of wind, wave and current conditions
- Tools for offshore grid and WF electric design
- Predictive tools for O&M
- New deep sea concepts

Participants

- Risø DTU (DK)
- ECN (NL)
- CRES (GR)
- CENER (ES)
- FhG IWES (DE)
- LNEG/INETI (PT)
- **SINTEF (NO) – SP coordinator**
- VTT (FI)
- Uni of Strathclyde (UK)
- Forwind / Uni of Oldenburg (DE)
- Forwind / Uni of Bremen (DE)
- Forwind / Uni of Hannover (DE)
- NTNU (NO)
- IFE (NO)
- DHI (DK)
- Uni of Aalborg (AAU) (DK)

Governance & Coordination



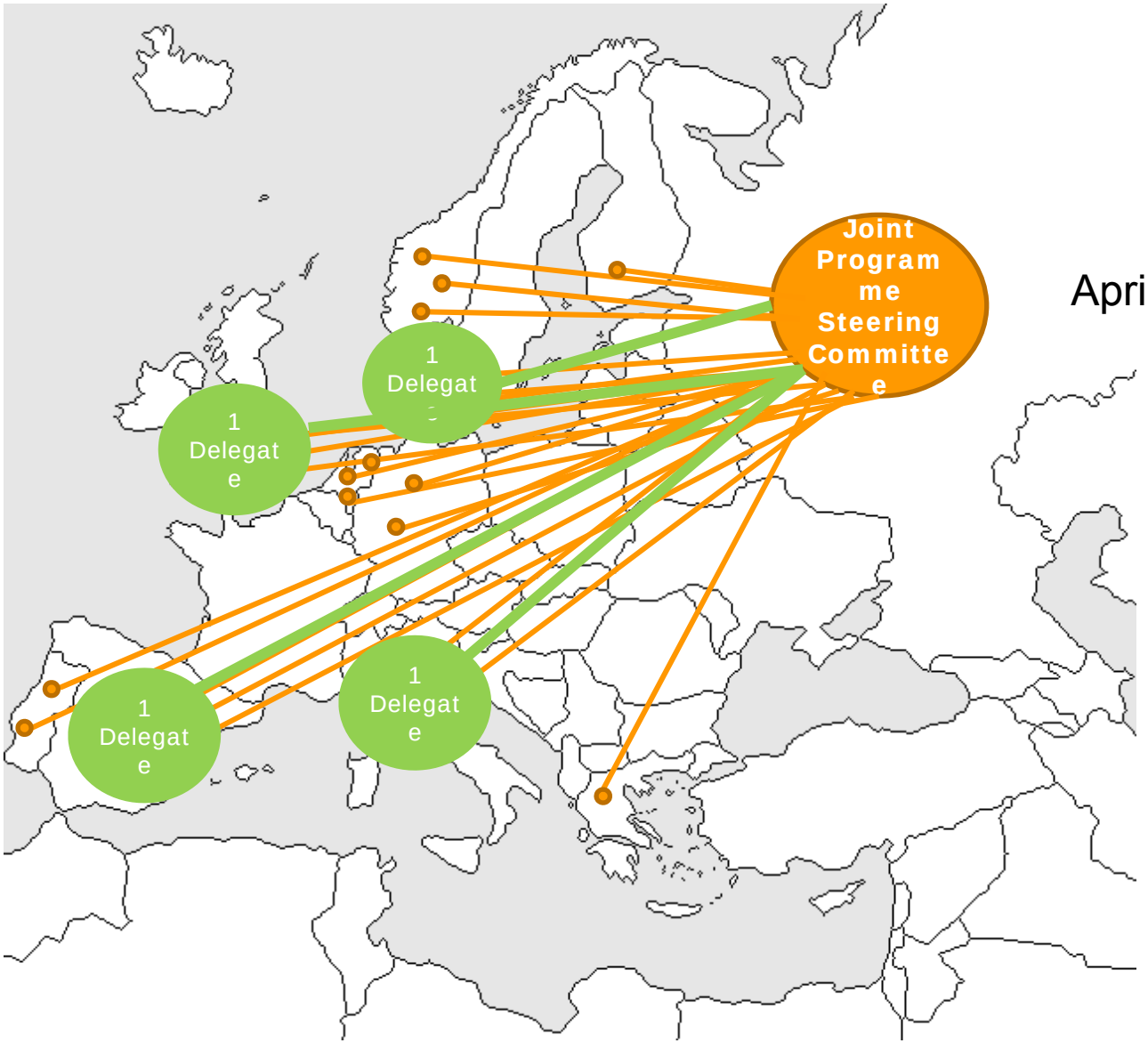
- Virtual centres working as one team on one topic
- Long-term strategy and work plan
- Agreed Description of Work
- Agreed Objectives and Milestones
- Agreed Division of Tasks and Responsibilities
- Context supporting specialisation of Participants

EERA Wind Members

Full participants		Associated Participants	
DTU Wind Energy	DK	DHI, University of Aalborg, Dublin (IR)	DK
ECN	NL	TU Delft, WMC	NL
SINTEF	NO	NTNU, IFE, UoB, CMR	NO
CRES	GR	NKUA	GR
CENER	ES	CIEMAT, IREC, CTC, CIRCE, Technalia,IK4 Alliance, IC3	ES
Fraunhofer IWES	GER	IEN (PO)	GER
Forwind / University of Oldenburg	GER	Forwind/University of Bremen, Hannover	GER
LNEG	POR	University of Porto	POR
VTT	FI		
TUBITAK	TU		
University of Strachclyde	UK		
CNR	IT	ENEA, Politecnico di Milano	IT
Belgian Energy Research Alliance	BE		

Committed man years: More than 200 per year.
13 full participants & 23 associated participants from 14 countries.
Futher applicants are interested to join.
National coordination (nodes/alliances) under development.

Organisation in JP Wind



April 2012

Achievements

- Rolling work plan and strategy developed
- Influence EU policy making in R&D for Energy at the highest level
  - Participating in the SET-PLAN Education and Training Exercise
  - Provided input to the SET-PLAN Materials Roadmap Working Group
  - Provided input to EC hearing on priorities for future Research Infrastructures calls
  - Actor of the International Cooperation strategy of EU
    - Participation in workshops: Beijing, more to follow…
  - Etc.
- Lobbying to insert research topic in FP7 and Horizon2020 Work Programmes
  - Yearly basis, rooted in strategy and action plan
- Projects… Funding to do research.

TPWIND & EERA JPWE

- EERA JP Wind Energy members collaborate with industry members in TPWIND working groups on the development of SRA and contribute to the EWI implementation plan and work programme
- Two members in the Implementation Team of the Industrial Initiative Wind.

- Memorandum of Understanding signed between EERA JP Wind Energy MB and the Executive committee of TPWind.
- EERA JP Wind Energy has two members in the Advisory Committee of TPWind.
- The ExCo of TPWind has appointed two members of the EERA JP Wind Energy Advisory Committee.
- Dialogue between TPWind ExCo and EERA JP Wind Energy MB

European Wind Energy Technology Platform

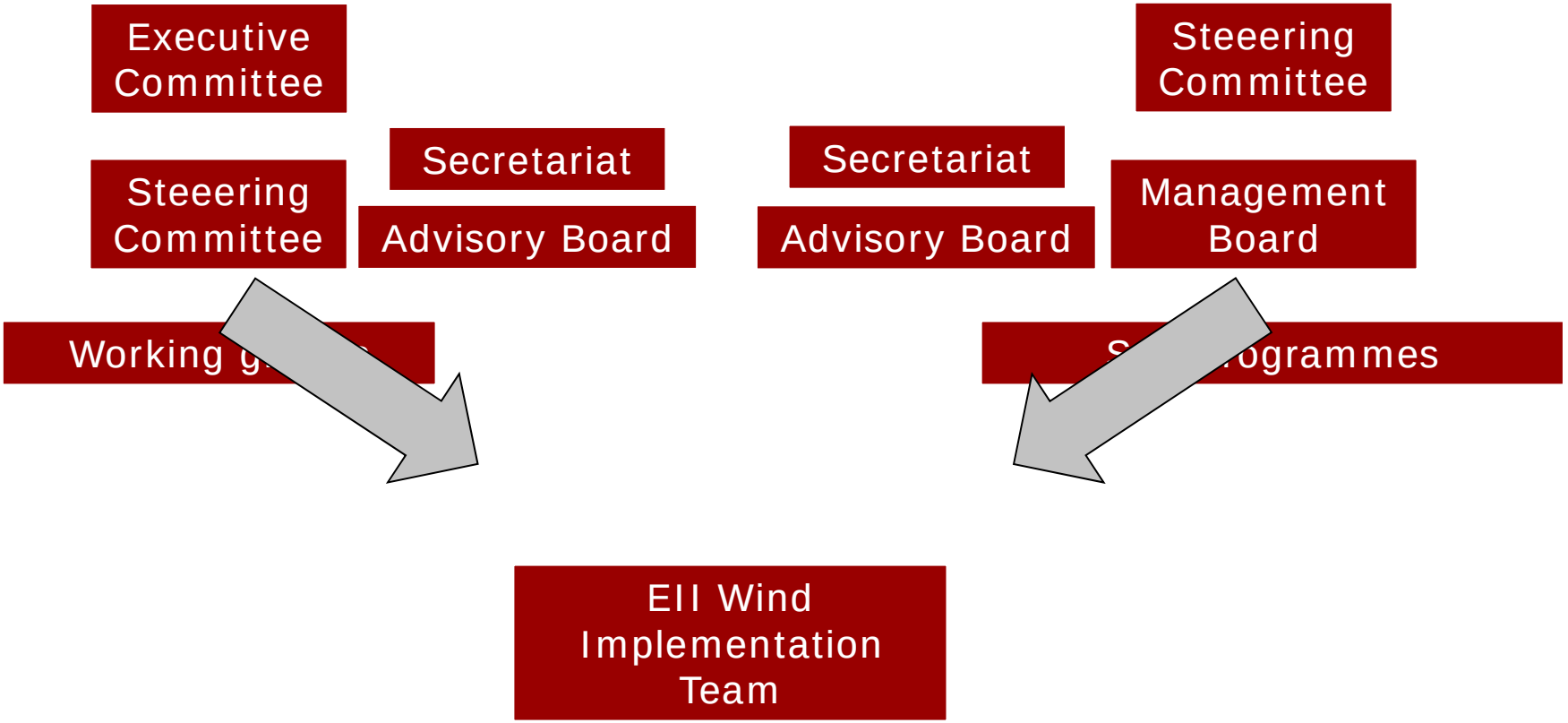
EERA European Energy Research Alliance

DTU

- Industry driven
- Development, test & demonstration
- Forum, network for the sector

- Research community driven
- Medium to long-term research
- Implementation, network

- Both recognized as essential tool of the SET-Plan speaking on behalf of European industry and research community
- Legitimate partners to be consulted when EC draft calls
- Everything is strongly coordinated


European Wind Energy Technology Platform
EERA
European Energy Research Alliance
Executive Committee
Steeering Committee
Secretariat
Advisory Board
Steeering Committee
Secretariat
Advisory Board
Management Board
Working g
S ogrammes
EII Wind Implementation Team

EERA objectives and instruments

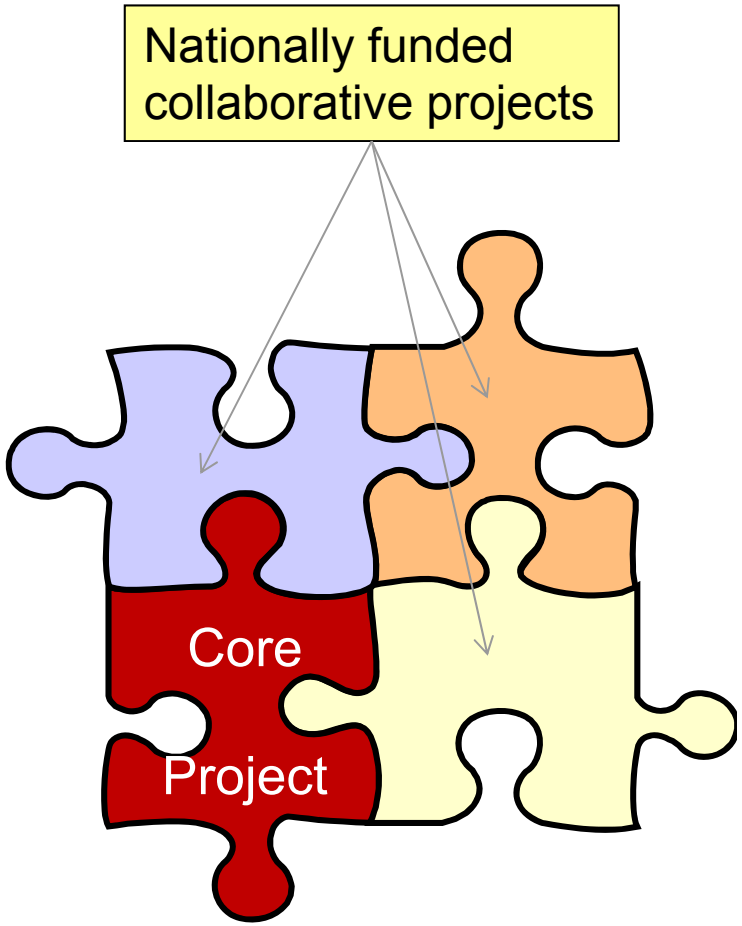
Objective	Means	EERA instruments
Avoid duplication	Knowledge sharing	Workshops, *training and mobility schemes*, infrastructure sharing
Prioritize and align	Joint strategy and program planning	Workshops, *task forces* for drafting strategies, "white papers", DoW, roadmaps etc Interaction with EU and national programs Joint strategy and annual action plans (DoW) Annual follow-up and reporting
Improve quality, agility and efficiency	R&D cooperation based on strongest competences	Establish *pilot projects* Efficient procedures and processes for project planning, execution and *joint technical teams* in multi-lateral projects Sharing research infrastructure
Increase impact	Innovation, industry cooperation and education	Establish *pilot projects* Interaction with industry through advisory boards and EII One-door-entry point for industry for cooperation with EERA JPWE
International outreach	Pre-competitive research cooperation plus information and staff exchange	Organize participants into a single European partner for bilateral EU-XX research and exchange programs

EERA Projects

- **EERA DTOC –** Design Tool for Offshore Clusters (started)
- ESFRI European **WindScanner** Facility Preparatory Phase project (started)
- **INNWIND.eu** (started)
- **AVATAR** Demonstration of Advanced Aerodynamic Tools on Large-Scale Rotors (approved for negotiation)
- **European Wind Atlas** (ERA NET+, 1 phase call for Funding Agencies)
- **IRPWIND** (approved for negotiation)
  - ✓ Other EU projects: Deepwind, VIDAT, Virtual Campus Hub
  - ✓ Other industry led projects coordinated with EERA: **Windtrust** (started)

IRPWIND (approved for negotiation)

- Pilot for Horizon 2020
- A new scheme
- A programme not a project
- Integrating national projects
- Budget: 10 M EUR, 4 years
  - Coordination and support actions (CSA): 4 M EUR
  - Collaborative projects (CP): 6 M EUR
    a) Structural reliability of wind turbine components
    b) European measures for large scale integration
    c) Design of offshore wind farms



IRPWIND – CSA elements (1)

Integrating Activities (WP2)

- Secretariat
- Yearly reports and strategic documents
- National coordination as input to the yearly reporting and strategy process
- Interaction with EC and Member States
- Interaction with the Wind Energy Sector in the IRPWIND Advisory Board
- Developing an Evaluation scheme and Business Plan for future steps
- Development of InCo strategy for EERA IRP on Wind Energy

Tranfer of Knowledge (WP4)

- EWEA involved as only ”industry” partner
- Organisation of annual dissemination between EERA JPWind participants
- Organisation of annual dissemination events for industry
- General IRPWIND Dissemination
- Establishment of network of technology transfer experts
- Specific dissemination and Exploitation of funded IRP activities
- Presentations and publications

IRPWIND – CSA elements (2)

Research infrastructure scheme (WP3)

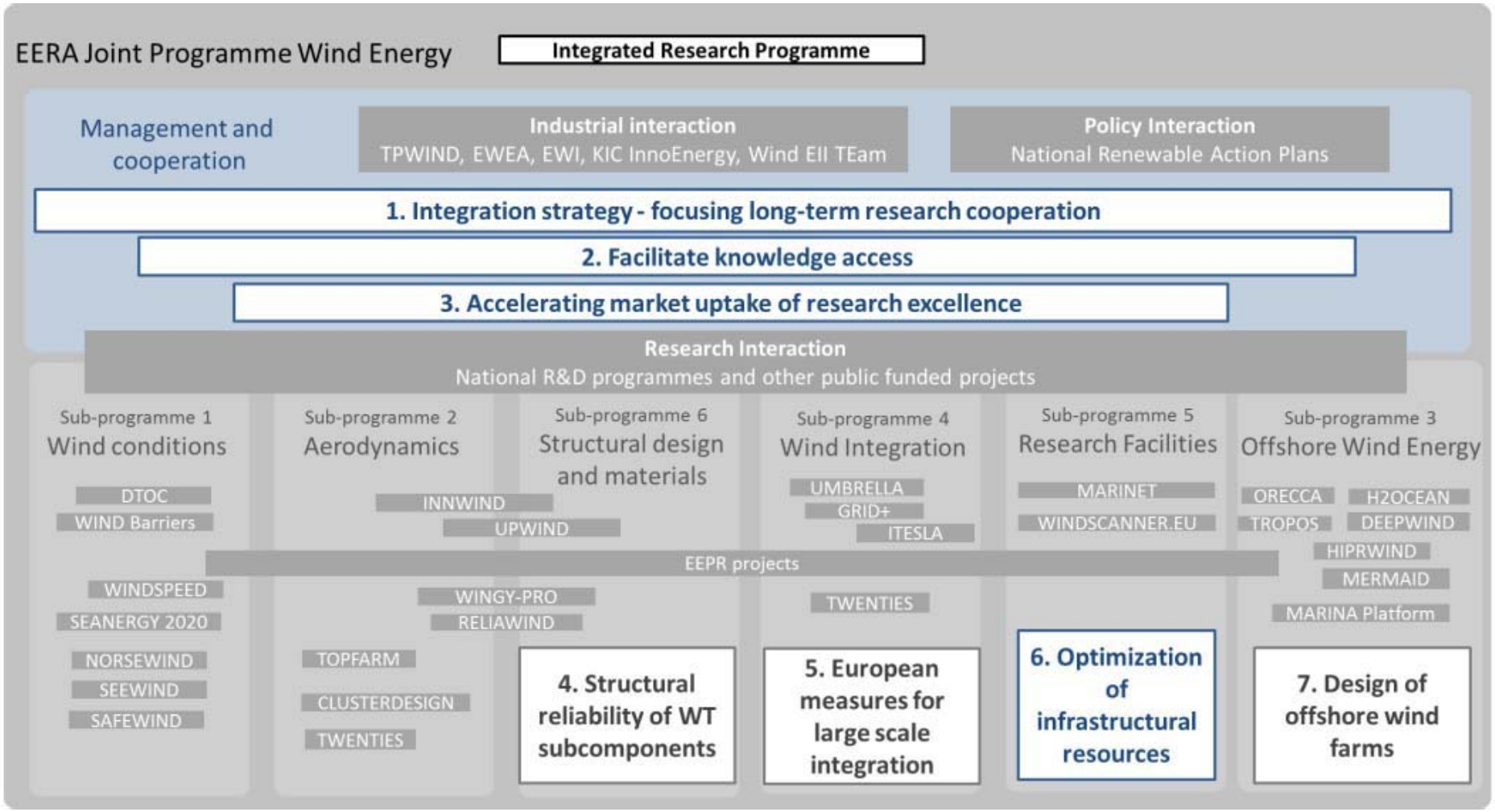
- Support to host and user
- Experiments Definition and Access Granting
- Networking activities in the following priority areas:
  - Research Wind turbines for aerodynamics and loads study;
  - Wind energy tunnels; and
  - Grid integration

➢*Pilots for (hopefully) dedicated H2020 Research Infrastructure calls*

Mobility Scheme (WP5)

- 50% to exchange IRP CPs
- 50% to future needs to be identified within all EERA Sub programmes
- 18 man/years plus travel expenses
- Mobility periods of 1 month, 3 months and 6 months.
- 4 cycles of calls
- Everything to be evaluated annually
- The proposals should be integrative to the DoW of the IRP and serve as an effective means for closing the gaps identified.
- Researchers “bring own project” the project should “match” projects ongoing at the hosting institution.

IRPWIND – Filling a Gap

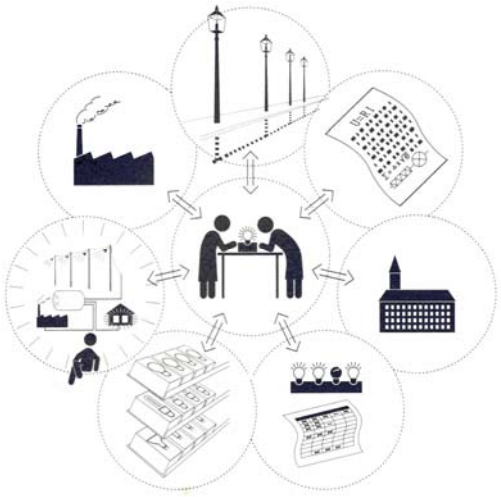


Challenges for alignment

- International sector
- Potential for knowledge and infrastructure sharing
- R&D based on strongest European competences

But

- National priorities
- Different support levels in member states
- Synchronization of program calls
- Decision processes
- R&D is global – but – jobs are local



Thank you for your attention